



VERIFICATION

I, Hanae SASADA, residing at Hyogo, Japan, state:
that I know well both the Japanese and English languages;
that I translated, from Japanese into English, the
priority document as filed in the U.S. Patent
Application No. 09/788,391, filed on February 21, 2001;
and that the attached English translation is a true
and accurate translation to the best of my knowledge
and belief.

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[Title of the Invention] DISPLAY SYSTEM AND
RECORDING MEDIUM

[What is claimed is:]

- 5 1. A display system for displaying detail
data comprising:
 detail data to be displayed;
 a structure for storing hierarchical
information used in totalizing the detail data; and
10 means for totalizing the detail data on the
basis of the structure and displaying results.
2. The display system according to claim 1,
wherein the structure, totalization results or data
at a level specified on the structure, and, if
15 necessary, totalization results or data at a level
even lower than the specified level are displayed
on the screen.
3. The display system according to claim 2,
wherein totalization results or data at the specified
20 level, at the lower level or at a level even lower
than the lower level is displayed.
4. The display system according to any one
of claims 1 through 3, wherein the detail data is
classified into X, Y and Z groups, and the structures
25 each having a hierarchical structure are created.

5. A computer-readable recording medium on which is recorded a program that allows a computer to operate as:

means for inputting detail data to be
5 displayed;

means for inputting structures each having totalization hierarchical information of the detail data; and

means for totalizing the detail data on the
10 basis of the structures and displaying results.

[Detailed Explanation of the Invention]

[0001]

[Field of the Invention]

The present invention relates to a display
15 system which makes displays on the basis of detail data and structures, and a recording medium.

[0002]

[Prior Art Technology]

In plants, information collected and added by
20 categories on the basis of production planning, etc. are displayed on screens. For example, the week's or month's totals are displayed in tabular form on the basis of production planned numbers by days or the totals by goods are displayed in tabular form
25 on the basis of production planned numbers by goods.

Conventionally, classification information required for totalization is added to data divisions, and each classified total is computed in a corresponding totalization logic and then
5 displayed.

[0003]

[Problems to be Solved by the Invention]

However, the order of display of detail information or the units of totalization vary greatly
10 from user to user. In this case, since there exists a plurality of items of information to be totalized to which a user wants to refer, it is required to switch the units of totalization from one to another instantly. To this end, it becomes necessary to
15 develop as many programs as users corresponding to their requests, which requires a too large amount of work to implement.

[0004]

Since classification information required for
20 totalization work is required to be added to data divisions, addition of items of totalization requires addition of items of classification to all detail data. Also, it is impossible to add new totalization keys instantly.

25 [0005]

To solve these problems, it is an object of the present invention to create detail data and structures representing totalization hierarchies, to display the totalization results at a level
5 specified on the structures, at a lower level, and, if necessary, at an even lower level at one time, to eliminate the need to add classification information to data divisions as in the prior art and to switch the levels instantly so as to display
10 necessary totalization results.

[0006]

[Means for Solving the Problems]

Means for solving the problems will be described below with reference to FIG. 1.

15 In FIG. 1, detail data 1 is data to be displayed.

[0007]

A structure 2 has totalization hierarchical information of the detail data 1.

Computing means 3 is adapted to, on the basis
20 of the structure 2, totalize the detail data 1 and produce the totalization result 4.

[0008]

The totalization result 4 is the result of totalization of the detail data 1.

25 Display means 5 displays the structure 2 and

the totalization result, etc. on a display screen.

[0009]

Next, an operation will be described.

Computing means 3 totalizes the detail data
5 1 on the basis of the structure 2 and produces the
totalization result 4. Display means 5 displays the
structure 2 and the totalization result 4 on a display
screen.

[0010]

10 In this case, in addition to the structure 2
and the totalization result 4 at a level specified
on the structure 2, the totalization result 4 or
data at a lower level than the specified level is
displayed on a display screen as required.

15 [0011]

In addition, the structure 2 and the
totalization results or data at a level specified
on the structure 2, at a lower level, and at an even
lower level are displayed on a display screen.

20 [0012]

The detail data 1 is classified into X, Y and
Z groups, and structures 2 each having a hierarchical
structure are created.

Thus, by creating detail data 1 and structures
25 2 representing totalization hierarchies and

displaying the totalization results at a level specified on the structures 2, at a lower level, and, if necessary, at an even lower level at one time, it becomes possible to eliminate the need to
5 add classification information to data divisions as in the prior art and to switch the levels instantly so as to display necessary totalization results.
[0013]

[Preferred Embodiments]

10 An embodiment of the present invention and its operation will be described in detail below with reference to FIGs. 1 through 11.
[0014]

FIG. 1 shows the configuration of a system
15 according to the present invention.

In FIG. 1, detail data 1 is data to be displayed. Detail data are data concerning production planned numbers by days, data concerning production planned numbers by goods, etc. (see FIGs. 8 to 13)

20 [0015]

A structure 2 is a structure having totalization hierarchical information of the detail data 1. For example, the detail data is classified into X-, Y- and Z-axis groups and each group is
25 represented by a hierarchical structure (see FIG.

2 and FIGs. 8 to 11).

[0016]

Computing means 3 is adapted to, on the basis of a level specified on the structure 2, totalize
 5 detail data 1 at that level and produce the totalization result 4 (which will be described later with reference to FIGs. 3 to 11).

[0017]

The totalization result 4 is the result of
 10 totalization of detail data 1.

Display means 5 displays the structure 2 and the totalization result on a display screen (which will be described with reference to FIGs. 2 to 11).

[0018]

15 FIG. 2 is an explanatory diagram of the present invention.

In FIG. 2, the structure 2 is one for each user and has the following hierarchical structure:

[0019]

20 person in charge of purchase (case 1): purchase order-business connection-goods

person in charge of purchase (case 2): purchase order-goods-business connection

25 person in charge of business (case 1): receipt of order-plant-goods

person in charge of business (case 2) : receipt
of order-goods-plant

For example, a person in charge of purchase
(case 1) is an example of a structure having a
5 hierarchical structure of purchase order-business
connection-goods. A person in charge of purchase
(case 2) is an example of a structure having a
hierarchical structure of purchase order-goods-
business connection. Each structure is made to have
10 a hierarchical structure which is conveniently easy
to use to meet user's requirements. Likewise, in
the case of business as well, as shown in FIG. 2,
each structure is made to have a hierarchical
structure easy to use.

15 [0020]

Purchasers 11, which order goods, are A and
B plants here. For persons in charge of purchase
work, such structures 1 for persons in charge of
purchase (cases 1 and 2) of the purchasers 11 as
20 have hierarchical structures as described above and
shown in FIG. 2 are easy to use.

[0021]

Order receivers 12, which receive orders for
goods from purchasers 11, are business connections
25 X and Y here. For persons in charge of business who

receive orders for goods, such structures 1 for persons in charge of business (cases 1 and 2) as have hierarchical structures as described above and shown in FIG. 2 are easy to use.

5 [0022]

As described above, the structures 1 are individually created each of which is easy for a respective one of users (persons in charge of purchase and persons in charge of business) to use.
10 As will be described later, when a user specifies a level on the corresponding structure 1, it becomes possible to automatically display the totalization results at the level specified on the structure 1 and at a lower level or levels in a manner easily
15 viewable for each user and quickly (which will be described with reference to FIGs. 3 to 11).

[0023]

FIG. 3 is a flowchart illustrating the overall operation of the present invention.

20 In FIG. 3, in step S1, the detail data 1 and the structure 2 corresponding to a user are read in.

[0024]

In step S2, figures at each level are totalized.
25 Figures at each level in the structure 2 are totalized

according to the detail data.

In step S3, results are stored in a file. The totals at the levels in the structure 2, which are computed in step S2, are stored in a file.

5 [0025]

In step S4, an axis is specified. The user specifies an axis (any of X, Y and Z axes) to be displayed in the structure 2 read in step S1 (refer to FIGs. 8 to 11 described later).

10 In step S5, the display level in the hierarchy is changed. The user changes the level to be displayed in the hierarchical structure of the axis specified in step S4 (the user specifies the level to be displayed).

15 [0026]

In step S6, detail data corresponding to only the displayed contents in the hierarchy (or the totalization results) are extracted. From the contents of the file computed in step S3, the
20 totalization results or detail data at the level specified, for example, in step S5 and at the two next lower levels are extracted (it is assumed here that the totalization results or detail data at three levels are extracted and displayed as shown in FIGs.
25 8 to 11).

[0027]

In step S7, the specified level is displayed at the leftmost end of the screen. As shown at (5) in FIG. 8, the totalization result at the specified level (4/2W) in the hierarchical structure displayed in the left window is displayed at the leftmost end of the right window.

[0028]

In step S8, the display screen is scrolled. The initial display screen displayed in step S7, for example, the display screen shown in FIG. 8 is scrolled until the desired totalization result or data appears on the screen. The user refers to the displayed result or data.

In step S9, data are entered. Data are entered in the state where the desired totalization result or data is displayed in step S8. A return is made to step S2 to update the detail data and repeat the totalization of figures at each level based on the updated detail data.

[0029]

Thus, the total of figures at each level in the structure 2 is computed on the basis of the detail data 1 and the structure 2 for each user. The totalization results or data at the level specified

on the structure 2 corresponding to the specified axis and at two next lower levels are displayed on the screen with the specified level at the leftmost end as shown in FIGs. 8 to 11. Thereby, it becomes
5 possible to display the totalization results or data at the level specified on the axis specified in the hierarchy corresponding to the structure 2 for each user and at some lower levels intelligibly and quickly. In addition, the user is allowed to make
10 data entry.

[0030]

FIG. 4 is a flowchart explaining the operation of the present invention.

In FIG. 4, in step S11, the X, Y or Z axis is
15 specified. Specifically, as shown at, for example, (1) in FIG. 8, the X axis is selected (specified), for example, from one of X, Y and Z buttons which will be described later.

[0031]

20 In step S12, a level is specified. A level to be displayed on the structure for the axis specified in step S11, the X axis selected as shown at, for example, (1) in FIG. 8 (the structure 2 displayed in the left window) is specified as shown
25 at (5) in FIG. 8.

[0032]

In step S13, the totalization results at the specified level and the totalization results at the next lower level are displayed in the upper window.

5 The totalization results at the specified level and the totalization results at the next lower level are displayed in the window in the upper right portion of, for example, FIG. 8.

[0033]

10 In step S14, detail data at the level two-level lower than the specified level are displayed in the lower window. The totalization results or detail data at the level which is two level lower than the specified level are displayed in the window in the
15 lower right portion of, for example, FIG. 8.

[0034]

In S15, the specified level is moved to the top of the screen. The totalization results or detail data at the level specified on the structure
20 2 displayed in the left window shown in, for example, FIG. 8 are moved to the top left end in the upper/lower windows on the right-hand side of FIG. 8, thereby providing an easy-to-view display as shown at (5) in FIG. 8.

25 [0035]

In step S16, a decision is made as to whether the processing is to be terminated or not. If YES, the processing comes to an end; otherwise, a return is made to step S12 to repeat the above processing.

5 Thus, when a level is specified on the structure 2 corresponding to the specified axis, the totalization results at the specified level and the next lower level are displayed in the upper right window of, for example, FIG. 8 and the totalization
10 results/detail data at the level which is two level lower than the specified level are displayed in the lower right window, and then the totalization results at the specified level are displayed at the top left end of the window for easier viewing through
15 scrolling. Thereby, the mere specifying of a level on the structure 2 corresponding to the specified axis allows the totalization results/detail data at the specified level, at the next lower level and at the level which is two level lower than the
20 specified level to be displayed intelligibly.

[0036]

FIG. 5 is a flowchart explaining the operation of the present invention.

In FIG. 5, in step S21, the Y axis is specified.
25 The Y axis is selected (specified) as shown at, for

example, (2) in FIG. 9. Then the structure 2 corresponding to the Y axis is displayed in the left window of FIG. 9.

[0037]

5 In step S22, information to be displayed is selected through check BOX. Information to be displayed is selected through check BOX on the Y-axis structure 2 displayed in the left window of, for example, FIG. 9 in step S21.

10 [0038]

 In step S23, only the selected information is displayed. Only information at a level lower by one on the structure 2 selected through the check BOX in step S22 is displayed.

15 In step S24, a decision is made as to whether or not the processing is to be terminated. If YES, the processing comes to an end; otherwise, a return is made to step S22 to repeat the above processing.

[0039]

20 Thus, when information to be displayed is selected on the structure 2 through the check BOX, only the information at the level which is one level lower than the specified level is displayed, thereby allowing the totalization results/detail data at
25 the level of the selected information, at the next

lower level and at the level two-level lower than the selected level to be displayed intelligibly in the upper and lower windows on the right-hand side of the screen as described above.

5 [0040]

FIG. 6 is a flowchart explaining the operation of the present invention.

In FIG. 6, in step S31, the detail data is read in.

10 In step S32, the structure is read in.

[0041]

In step S33, a computing table is prepared on the basis of the structure. A computing table (a table for totalization processing, say, a table in Excel) of FIG. 7 to be described later is prepared on the basis of the structure 2 read in step S32.

15

[0042]

In step S34, data are set in the computing table on the basis of tags in the detail data. As shown in FIG. 7, data is set in the computing table prepared in step S33 on the basis of tags in the detail data 1 (corresponding data is set in each cell marked with a circle).

20

[0043]

25 In step S35, data are totalized (or averaged

etc.) from a lower level to an upper level. Totalization is carried out on data which are set in cells marked with circles in FIG.7 in step S34, and the results of totalization are set in each of shaded cells.

[0044]

In step S36, the totalization results are displayed. A display routine is activated and, on the basis of the computing table of FIG. 7 in which the detail data and the totalization results have been set in step S34 and S35 respectively, the totalization results/detail data at the specified level and at the next lower level are displayed in the upper window on the right-hand side of FIGs. 8 to 11 and the totalization results/detail data at the level which is two level lower than the specified level are displayed in the lower window.

[0045]

Thus, a computing table (for example, a table in Excel) is prepared on the basis of the detail data 1 and the structure 2, data are set in the computing table on the basis of tags in the detail data 1 and the totalization results are set in the computing table, allowing the totalization results/detail data at the level specified on the

structure 2, at the next lower level and at the level which is two level lower than the specified level to be displayed on the screen in an intelligent manner.

5 [0046]

FIG. 7 is an explanatory diagram of the present invention (a computing table). This is a computing table which is used for totalization processing at the time of placing orders. This table corresponds
10 to a table, for example, in the Excel (registered trademark). A table corresponding to the hierarchy in the structure 2 is created. Data are set in cells other than shaded cells on the basis of tags in the detail data 1. The shaded cells are portions where
15 the totalization results are set. In each shaded cell, the content of the totalization processing is set and the totalization result is set on the bases of the detail data.

[0047]

20 FIGs. 8 to 11 show display examples in the present invention.

FIG. 8 shows a first display example according to the present invention.

In this example, the structure 2 corresponding
25 to the X axis is displayed in the left window since

X has been selected as shown at (1) in FIG. 8. On the structure 2, the level (4/2W: the second week of April) is specified as shown at (5). When the user specifies the level (4/2W), such upper and lower
5 windows as shown in FIG. 8 are displayed in the right-hand portion of the screen.

[0048]

The right window is divided into the upper window and the lower window. As shown in FIG. 8,
10 in the upper window are displayed the totalization results at the level selected on the structure 2 and the results at the next lower level. The totalization result is displayed as shown in FIG. 8 with information at the selected level (4/2W)
15 corresponding to the X axis on the structure 2 set in the leftmost end of the right window, using levels corresponding to the Z axis as a key, in correspondence with the shown information corresponding to the Y axis as shown in upper area
20 in FIG. 8 (refer to (5) in FIG. 8). In the lower window are displayed the totalization results at the level which is two level lower than the selected level.

[0049]

25 As described above, the structure 2

corresponding to the X axis is displayed in the left window since X has been selected on the screen as shown at (1) in FIG. 8. When the level to be displayed is selected on the structure 2, in the upper right window are displayed the totalization results at the selected level and the results at the next lower level. In the lower window are displayed the totalization results at the level which is two level lower than the selected level.

10 [0050]

FIG. 9 shows a second display example.

In this example, the structure 2 corresponding to the Y axis is displayed in the left window since Y has been selected as shown at (2) in FIG. 9. On the structure 2, the top level (BLOCK) is specified. When the user specifies the top level (BLOCK), such upper and lower windows as shown in FIG. 9 are displayed in the right-hand portion of the screen.

[0051]

20 The right window is divided into the upper window and the lower window. As shown in FIG. 9, in the upper window are displayed the totalization results at the level selected on the structure 2 and at the next lower level. The totalization result is displayed as shown in FIG. 9 with information

25

at the selected level corresponding to the X axis on the structure 2 set in the leftmost end of the right window, using levels corresponding to the Z axis as a key, in correspondence with the shown information corresponding to the Y axis as shown in upper area in FIG. 9. In the lower window are displayed the totalization results at the level which is two level lower than the selected level.

[0052]

10 As described above, the structure 2 corresponding to the Y axis is displayed in the left window since Y has been selected on the screen as shown at (2) in FIG. 9. When the level to be displayed is selected on the structure 2, in the upper right window are displayed the totalization results at the selected level and at the next lower level. In the lower window are displayed the totalization results at the level which is two level lower than the selected level.

20 [0053]

FIG. 10 shows a third display example.

In this example, the structure 2 corresponding to the Z axis is displayed in the left window since the Z axis has been selected as shown at (3) in FIG. 10. On the structure 2, the level shown at (6)

(CA1672-5701) is specified. When the user specifies this level shown at (6), such upper and lower windows as shown in FIG. 10 are displayed in the right-hand portion of the screen.

5 [0054]

The right window is divided into the upper window and the lower window. As shown in FIG. 10, in the upper window are displayed the totalization results at the level selected on the structure 2 and the results at the next lower level. The totalization result is displayed as shown in FIG. 10 with information at the selected level corresponding to the Z axis on the structure 2 set in the leftmost end of the right window, using selected level (PB) according to the Z axis as a key, in correspondence with the shown information corresponding to Y axis as shown in upper area in FIG. 10. In the lower window are displayed the totalization results at the level which is two level lower than the selected level.

10
15
20

[0055]

As described above, the structure 2 corresponding to the Z axis is displayed in the left window since the Z axis has been selected on the screen as shown at (3) in FIG. 10. When the level

25

to be displayed is selected on the structure 2, in the upper right window are displayed the totalization results at the selected level and the results at the next lower level. In the lower window are
5 displayed the totalization results at the level which is two level lower than the selected level.
[0056]

FIG. 11 shows a fourth display example.

In this example, the structure 2 corresponding
10 to the X axis is displayed in the left window since the X axis has been selected as shown at (4) in FIG. 11. On the structure 2, the level (4/8) shown at (7) is specified. When the user specifies this level (7), such upper and lower windows as shown in FIG.
15 11 are displayed in the right-hand portion of the screen.
[0057]

The right window is divided into the upper and lower windows. As shown in FIG. 11, in the upper
20 window are displayed the totalization results at the level selected on the structure 2 and at the next lower level. The totalization result is displayed with information at the selected level (4/8) corresponding to the Z axis on the structure
25 2 set in the leftmost end of the right window, using

levels according to the Z axis as a key, in
correspondence with the shown information
corresponding to Y axis as shown in upper area in
FIG. 11. In the lower window are displayed the
5 totalization results at the level which is two level
lower than the selected level.

[0058]

As described above, the structure 2
corresponding the X axis is displayed in the left
10 window of the screen according to the X axis selection
(4). When only the level as shown at (7) is selected
on the structure 2 so that the next lower level is
displayed, it becomes possible to display the
totalization results at the selected level and those
15 at the next lower level than the selected level in
the upper right window and to display the
totalization results at the level which is two levels
lower than the selected level in the lower right
window.

20 [0059]

[Effect of the Invention]

According to the present invention, as
described above, the detail data 1 and the structures
2 representing totalization hierarchies are created,
25 and totalization results at a level specified on

the structures 2, and those at the next lower level and, if necessary, at the level two-level lower than the specified level are displayed together, which eliminates the necessity of adding classification
5 information to data divisions as in the prior art and allows the levels to be switched instantly, allowing required totalization results to be displayed. Thereby, totalization information can be displayed very readily in a form each individual
10 user demands independently of data contents and regardless of the presence or absence of classification information for totalization.

[Brief Description of the Drawings]

FIG. 1 is a schematic representation of a system
15 according to the present invention;

FIG. 2 is an explanatory diagram of the present invention;

FIG. 3 is a flowchart explaining the operation of the present invention;

20 FIG. 4 is a flowchart explaining the operation of the present invention;

FIG. 5 is a flowchart explaining the operation of the present invention;

25 FIG. 6 is a flowchart explaining the operation of the present invention;

FIG. 7 is an explanatory diagram of the present invention (a computing table);

FIG. 8 shows an example of on-screen display image according to the present invention (no. 1);

5 FIG. 9 shows an example of on-screen display image according to the present invention (no. 2);

FIG. 10 shows an example of on-screen display image according to the present invention (no. 3);
and

10 FIG. 11 shows an example of on-screen display image according to the present invention (no. 4).

[Explanation of the Codes]

1: Detail data

2: Structure

15 3: Computing means

4: Totalization result

5: Display means

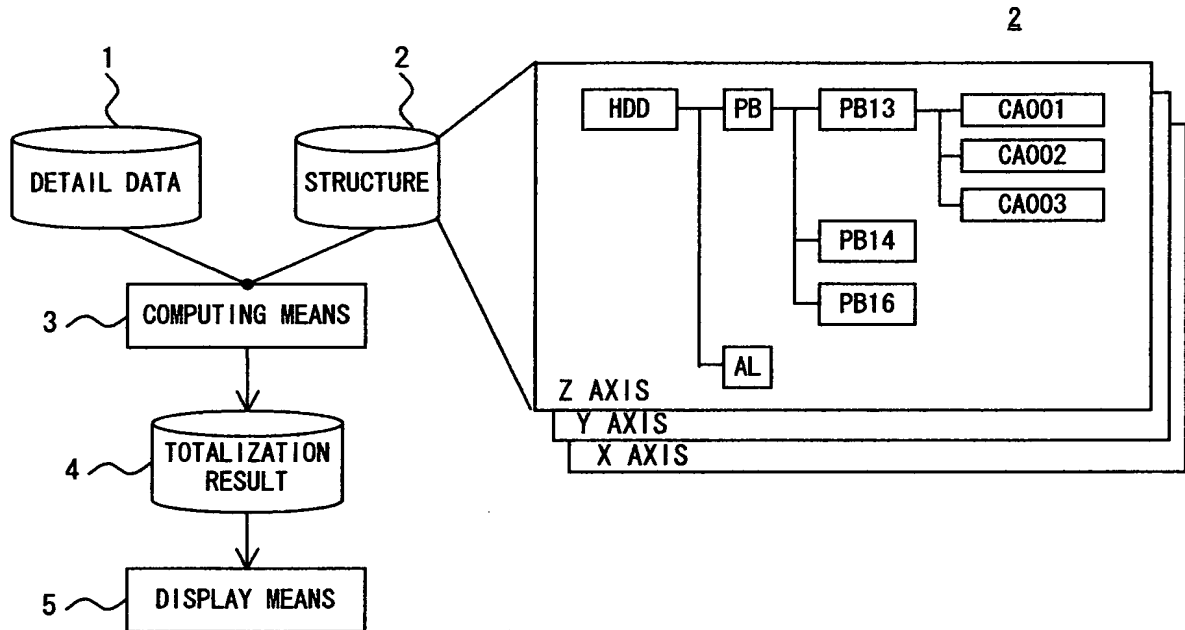
11: Purchaser

12: Order receiver

[Document Name] Drawings

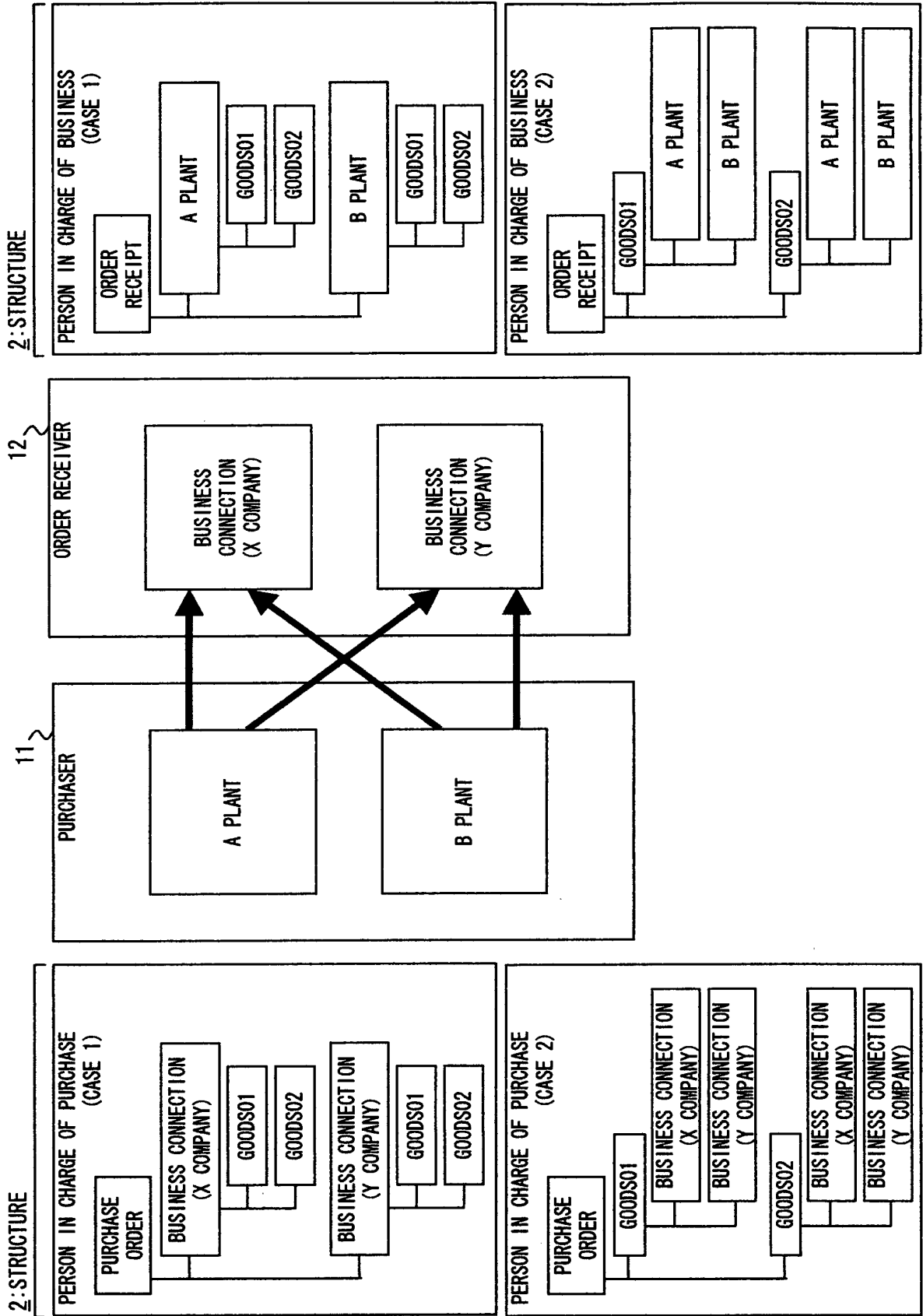
[FIG. 1]

Schematic representation of a system according
to the present invention



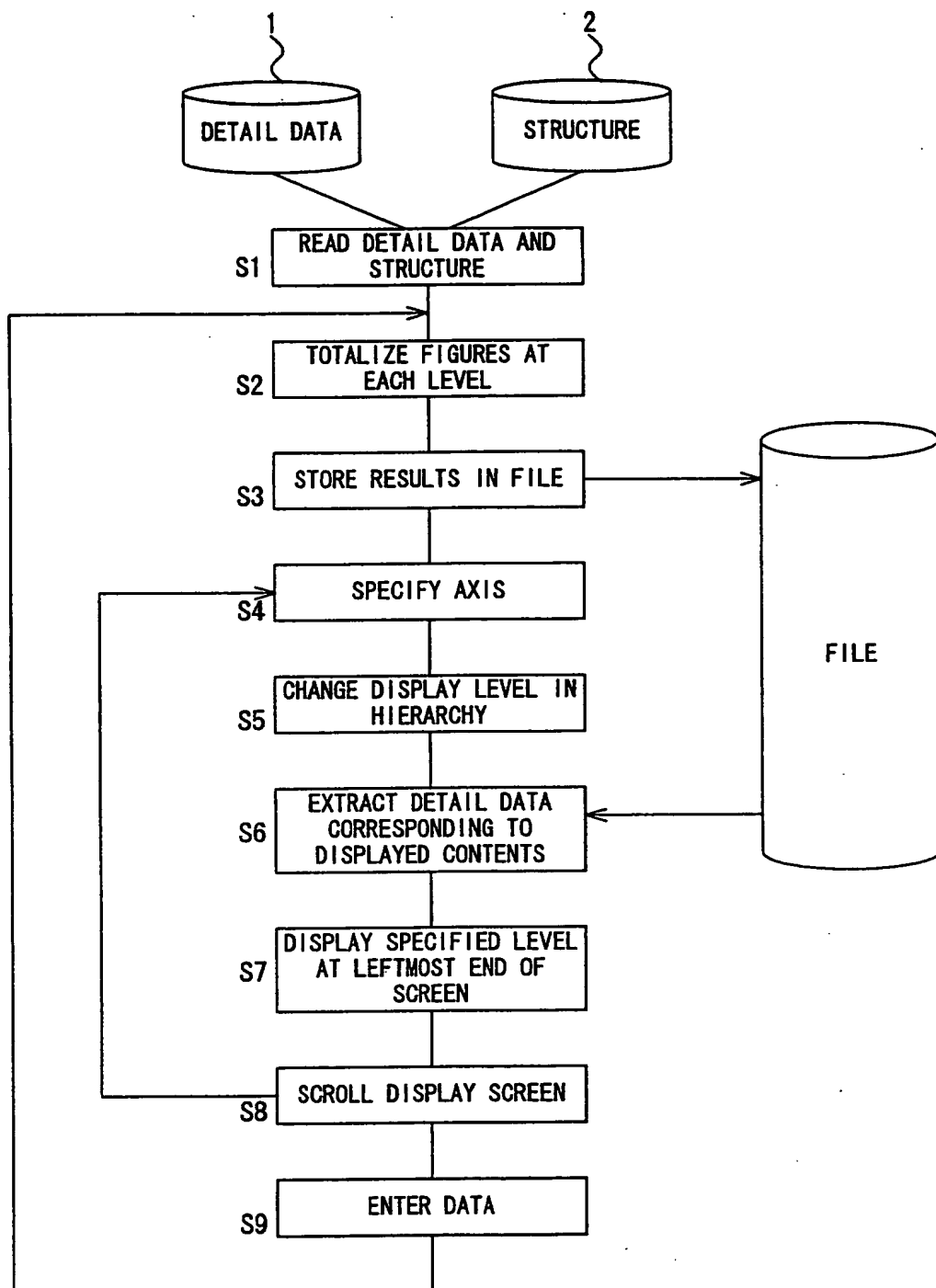
[FIG. 2]

Explanatory diagram of the present invention



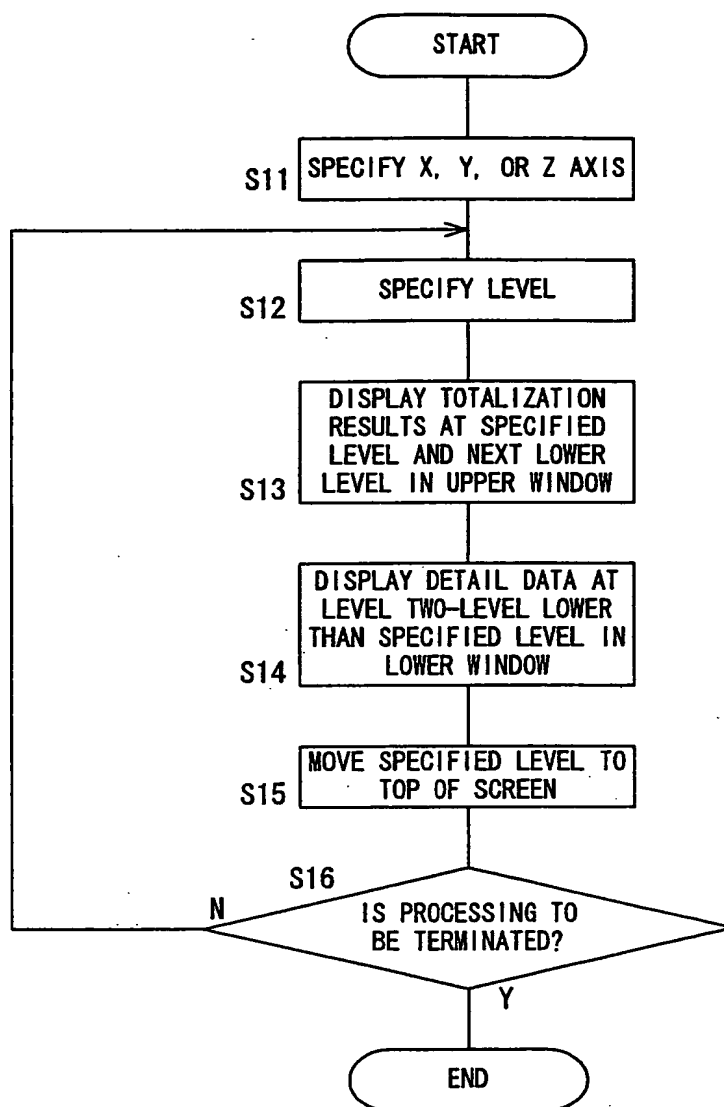
[FIG. 3]

Flowchart explaining the operation of the present invention



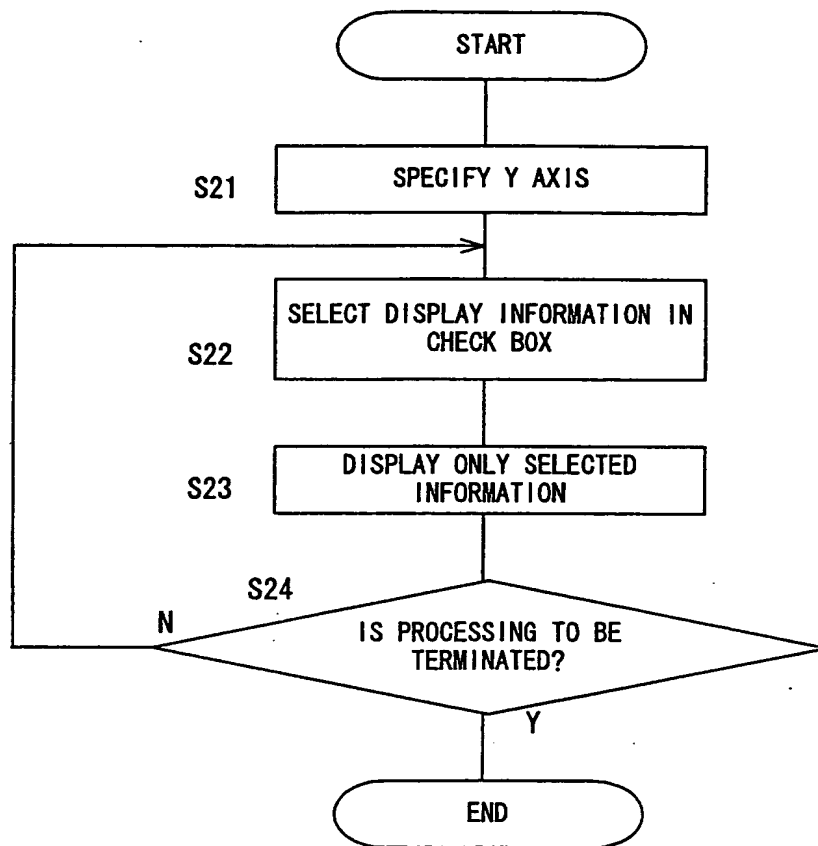
[FIG. 4]

Flowchart explaining the operation of the present invention



[FIG. 5]

Flowchart explaining the operation of the present invention



[FIG. 6]

Explanatory diagram of the present invention (a computing table)

○ ← DATA

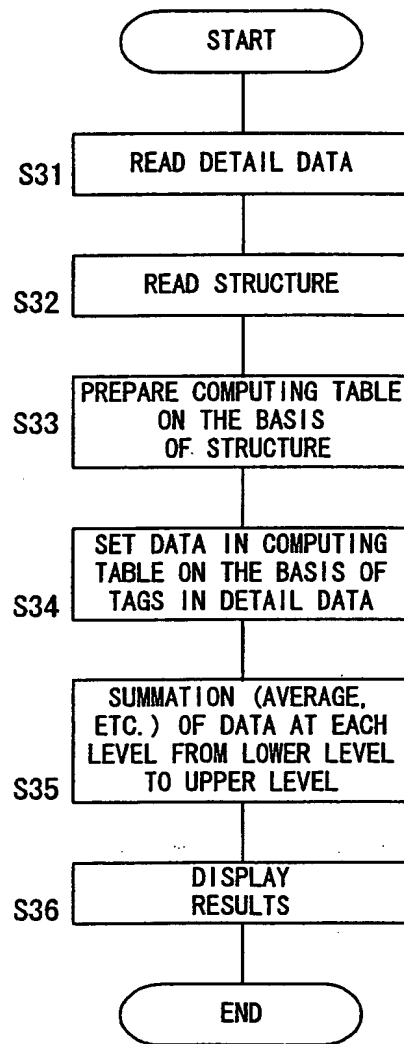
▨ ← COMPUTATIONAL RESULTS

EXAMPLE ←

		DATE				
BUSINESS CONNECTION	GOODS CODE	①4/1	②4/2	③4/3	④4/4	⑤APRIL/W TOTAL
X COMPANY	GOODS01 ^a	○	○	○	○	▨ Σ a1:a4
X COMPANY	GOODS02 ^b	○	○	○	○	▨
Y COMPANY	GOODS01 ^c	○	○	○	○	▨
Y COMPANY	GOODS02 ^d	○	○	○	○	▨
X COMPANY	TOTAL ^e	▨	▨	▨	▨	▨
Y COMPANY	TOTAL ^f	▨	▨	▨	▨	▨

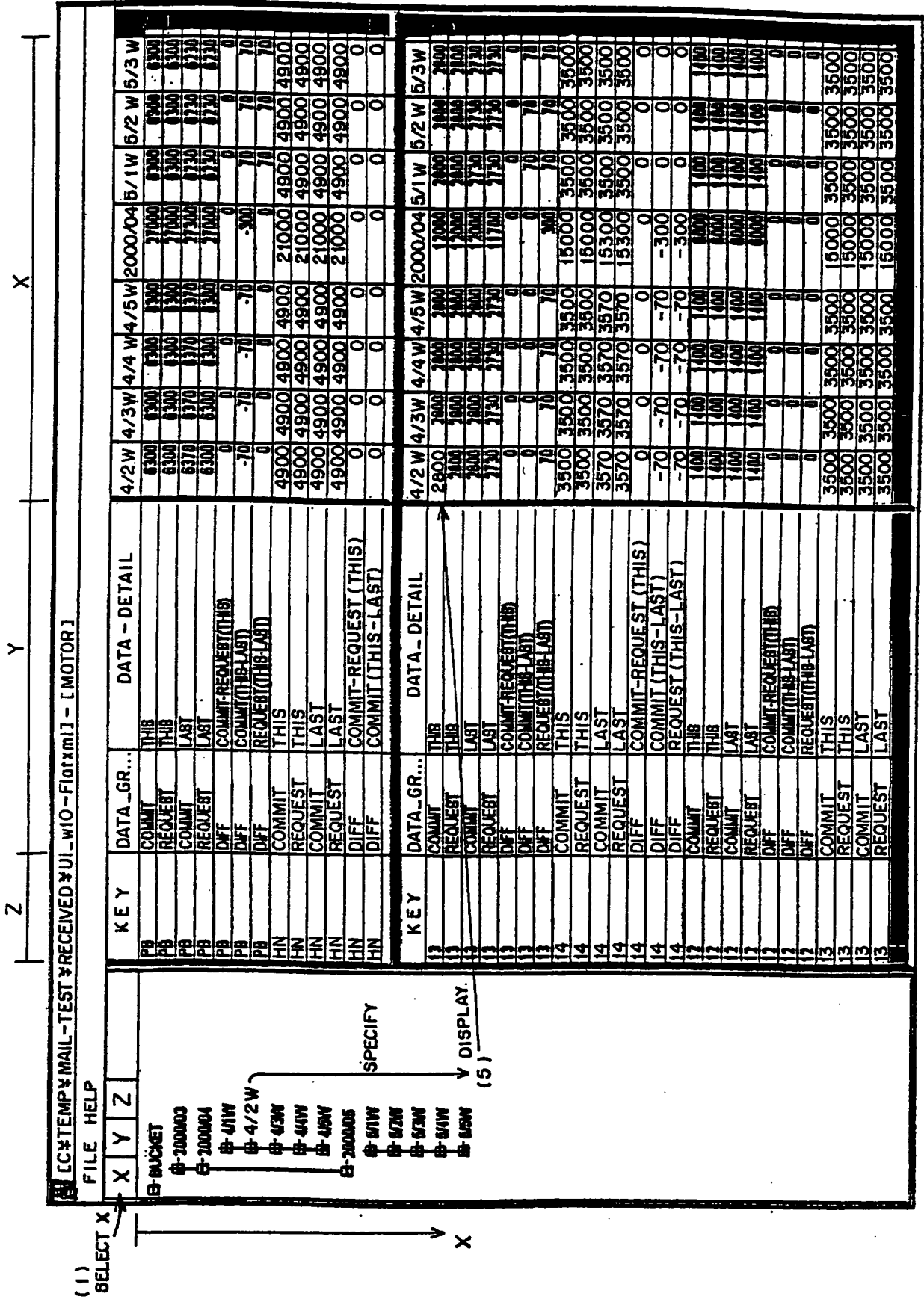
[FIG. 7]

Flowchart explaining the operation of the present invention



[FIG. 8]

Example of on-screen display image according to the present invention (no. 1)



Example of on-screen display image according to the present invention (no. 2)

X

 γ

Z

FILE HELP

 [C] [TEMP] MAIL - TEST # RECEIVED # UI - W10 - FORM1] - [PB]

[illegible]

(3) SELECT Z

Z

Y

x

[C*TEMP*MAIL-TEST*RECEIVED*U1-W10-Flat*xml]-[PB]

FILE HELP

[FIG. 11]

(4)

SELECT x

(2)

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[Document Name] Abstract

[Abstract]

[Object] The present invention relates to a display system which makes displays on the basis of detail data and structures, and a recording medium. It is an object of the present invention to create the detail data and the structures representing totalization hierarchies, to display the totalization results at a level specified on the structures, at a lower level, and, if necessary, at an even lower level at one time, to eliminate the need to add classification information to data divisions as in the prior art and to switch the levels instantly so as to display necessary totalization results.

[Means for Solving the Problems] A display system according to the present invention comprises detail data to be displayed, a structure for storing hierarchical information used in totalizing the detail data, and means for totalizing the detail data on the basis of the structure and displaying results.

[Selected Drawing] FIG. 1